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MSDS 420 – Assignment 1

Part 1

a. As stated in Relational Database Design and Implementation, "a functional dependency is a one-way relationship between two attributes, such that at any given time, for each unique value of attribute A, only one value of attribute B is associated with it throughout the relation." These dependencies therefore are used throughout the normalization process to break apart standalone entities and create relations. However, this is just the first step as identifying functional dependencies only gets us to 2NF. To move onto 3NF, we need to solve for partial and transitive dependencies.

Part 2

a. The functional dependencies for 1NF: (NIN, contractNo, hours, eName, hNo, hLoc) are as follows:
    a. NIN ->> eName
    b. contractNo ->> hNo, hLoc
    c. NIN + contractNO ->> hours
b. The attributes that are not dependent on the whole primary key and therefore are partial dependencies are:
    a. eName which is dependent on NIN only
    b. hNO is dependent on only contractNO
    c. hLOC is dependent on only contractNO
c. The transitive dependencies are:
    a. contractNo ->> hNo and hNo ->> hLoc
d. The 3NF relations are:
    a. Employee (NIN, eName)
    b. ContractHours (NIN, contractNo, hours)
    c. Hospital (hNo, hLoc)
    d. Contracts (contractNo, hNo)
e. The FK in each relation entity I created is listed below:
    a. Employee: None
    b. ContractHours: NIN, contractNo
    c. Hospital: None
    d. Contracts: hNo

Part 3

a. The functional dependencies for 1NF are below:
    a. patientNo, drugNo, startDate ->> fullname, wardNo, wardName, bedNo, drugName, description, dosage, methodOfAdmin, unitsPerDay, finishDate
    b. patientNo ->> fullname, wardNo, wardName, bedNo
    c. drugNo ->> drugName, description, methodOfAdmin
    d. patientNo + drugNo ->> unitsPerDay
    e. patientNo +drugNO + startDate ->> finishDate

b. The attributes that are not dependent on the whole primary key and therefore are partial dependencies are:
    a. fullname, wardNo, wardName, and bedNo which is dependent on patientNo
    b. drugName, description, methodofAdmin which is dependent on drugNo
    c. unitsPerDay which is dependent on patientNo and drugNo
c. The transitive dependencies are:
    a. patientNo ->> bedNo and bedNo ->> wardNo, wardName
d. The 3NF relations are:
    a. Patient (<u>patientNo</u>, fullname)
    b. BedAssignment(<u>patientNo</u>, <u>bedNo)</u>
        i. Needed because a single patient can visit multiple times and be assigned different beds.
    c. Bed (<u>bedNo</u>, wardNo, wardName)
    d. Drug (<u>drugNo</u>, drugName, description, methodOfAdmin)
    e. Treatment (<u>patientNo</u>, <u>drugNo</u>, <u>startDate</u>, finishDate)
e. The FK in each relation entity I created is listed below:
    a. Patient: None
    b. BedAssignment: patientNo, bedNo
    c. Ward: None
    d. Drug: None
    e. Treatment: patientNo, drugNo